



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Chin-Te Huang

Group Art Unit: 2856

Serial No.: 09/997,906

Examiner: Andre K. Jackson

Filed: Nov. 30, 2001

For: Liquid Leak Detection

Attorney Docket No.: 67,200-617

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Kathy Dixon

APPEAL BRIEF

Mail Stop: Appeal
Commissioner for Patents
Alexandria, VA 22313-1450

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Sir:

Appellants appeal in the captioned application from the Examiner's final rejection, dated May 19, 2003, of claims 1-21, under 35 USC §103(a) as being unpatentable over Suzuki, Gott and Moody.

It is urged that the rejection be reversed and that all the claims be allowed.

(1) REAL PARTY IN INTEREST

The real party in interest in the present appeal is the recorded Assignee of Taiwan Semiconductor Manufacturing Company, Ltd.

(2) RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that are known to the Appellants, the Appellants' legal representative, or the assignee.

(3) STATUS OF CLAIMS

Claims 1-21 are pending in the application.

Claims 1-21 stand rejected. No claims are allowed.

(4) STATUS OF AMENDMENTS

A Request For Reconsideration was filed on or about July 21, 2003.

An Advisory Action was received from the Examiner dated August 11, 2003 maintaining rejection of all claims.

A Notice of Appeal was filed on or about August 19, 2003.

(5) SUMMARY OF THE INVENTION

The invention is directed to the detection and localization of liquid leaks.

(Specification, page 1, paragraph 001)

In a preferred embodiment, the invention includes a pair of electrical conductors located in relative proximity to a fluid vessel. The pair of electrical conductors includes at least one insulated conductor characterized by an electrically insulative, porous sheath. Circuitry coupled to the electrical conductors is effective to measure resistance of the combination of the pair of electrical conductors and an electrical short there between caused by a liquid leak, whereby the resistance indicates the existence of a leak and the relative location of the leak along the at least one insulated electrical conductor.

(Specification, page 5, paragraph 0013)

(6) ISSUES

Issue I

Is the rejection of claims 1, 3, 5 and 6-21 under 35 USC §103(a) based on Suzuki and Gott proper when such references do not teach or suggest the specifically claimed limitations in the present application?

Issue II

Is the rejection of claims 2 and 4 under 35 USC §103(a) based on Suzuki, Gott and Moody proper when such references do not teach or suggest the specifically claimed limitations in the present application?

(7) GROUPING OF CLAIMS

The rejection of claims 1, 3, 5 and 6-21 are contested as a group.

The rejection of claims 2 and 4 are contested as a separate group.

(8) ARGUMENTS

Issue I

Claims 1, 3, 5 and 6-21 are rejected under 35 USC §103(a) as being unpatentable over Suzuki in view of Gott.

The rejection of claims 1, 3, 5 and 6-21 under 35 USC §103(a) based on Suzuki and Gott is improper and must be reversed.

Suzuki discloses a liquid detecting device comprising at least two parallel conductors separated by continuously porous polytetrafluoroethylene (PTFE) containing an electro-conductive

material. Suzuki teaches that when liquid comes into contact with and enters the continuously porous filled PTFE containing the electro-conductive material, that the electrical resistance of the material is remarkably increased (col. 5, lines 1-7). Suzuki also teaches that since the liquid detecting device is made mainly of PTFE which is inherently repellent to water, it is little affected by water and moisture (col. 5, lines 44-48).

Gott discloses a tape carrying flat, spaced conductors. The conductors are exposed and uninsulated. Furthermore, the conductors are always found in parallel pairs. Gott stresses that the flat nature of the conductors is critical in as much as small droplets may be impeded from migrating across the parallel conductors (col. 3, line 48 - col. 4, line 5).

In contradistinction, claim 1, as amended, clarifies the invention as having at least one electrical conductor characterized by an electrically insulative, porous sheath effective to provide electrical isolation of said at least one electrical conductor from the other electrical conductor and further having circuitry effective to measure a resistance of the combination of the pair of electrical conductors and an electrical short therebetween caused by local conductivity through the porous sheath at a location whereat said liquid leak penetrates said sheath.

The United States Court of Appeals for the Federal Circuit (CAFC) has stated in determining the propriety of a rejection under 35 U.S.C. § 103, it is well settled that the obviousness of an invention cannot be established by combining the teachings of the prior art absent some teaching, suggestion or incentive supporting the combination. See In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 U.S.P.Q. 657 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984). The law followed by our court of review and the Board of Patent Appeals and Interferences is that "[a] prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." In re Rinehart, 531 F.2d 1048, 1051, 189 U.S.P.Q. 143, 147 (C.C.P.A. 1976). See also In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984) ("In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings would appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification.") The determination under §103 is whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. Kahn v. General Motors

Corp., 135 F.3d 1472, 45 USPQ2d 1608 (Fed. Cir. 1998) See In re O'Farrell 853 F.2d 894, 903-904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988) ("Obviousness may not be established using hindsight.") See W.L. Gore & Assocs., Inc. v. Garlock, Inc. 721 F.2d 1540, 1550-51, 220 USPQ 303, 311 (Fed. Cir. 1983) ("In determining obviousness, the invention must be considered as a whole and the claims must be considered in their entirety.'')

With respect to the rejection of independent claims 1 and 13, none of the references cited, either alone or in combination with each other, teach or suggest the claimed invention. The proposed combination fails to yield Appellants' invention in as much as Suzuki requires an electrically conductive sheath which resistance increases with liquid contact. Appellants' invention requires electrically insulative sheathing and low resistance electrical short therethrough in the event of a liquid leak penetration. Furthermore, Suzuki specifically teaches its inherent repellence to water and hence inability to absorb water diluted liquids such as those outlined in the Appellants' specification thereby teaching away from the present invention. Similarly, Gott nowhere suggests, and in fact teaches away from, utilizing a sheathed conductor since such would add significantly to the thickness of the conductor, is not consistent with the "thin as possible" objectives (exemplary thickness of not in excess of 20 mils) and would impede flow across the conductors.

The references fail to provide the necessary motivation of one skilled in the art to combine the individual teachings to arrive at the Appellants' invention. The references, even when combined, fail to yield Appellants' invention.

Issue II

Claims 2 and 4 are rejected under 35 USC §103(a) as being unpatentable over Suzuki, Gott and Moody.

The rejection of claims 2 and 4 under 35 USC §103(a) based on Suzuki, Gott and Moody is improper and must be reversed.

As presented above, the Appellants have shown that nowhere in Suzuki one can find that one conductor is electrically insulated from the other by the electrical insulative porous sheath. On the contrary, Suzuki repeatedly teaches that the porous sheath, which separates the conductors, is electrically conductive (column 3, lines 16-20 of Suzuki; column 3, lines 61-63; column 4, lines 1-2 and 8-9; column 8, lines 35-36; column 8, line 67-column 9, line 2). For that reason, a combination of Suzuki and Gott would not have resulted in the appellants' invention as claimed in claim 1 in its entirety even if this combination had been motivated in Suzuki.

With this in view, the Appellants believe that neither Suzuki nor Gott, separately or in combination thereof, destroy the novelty of claim 1 (onto which claims 2 and 4 depend) as previously presented.

With reference to column 1, lines 11-14 and Figure 2 of Suzuki, the Office Action of 5/19/2003 asserts that, regarding to claims 13 and 18 of the appellants' invention, "Suzuki discloses where a pair of electrical conductors in proximity to a vessel at least one of the electrical conductors being elongate and having a sheath of an electrically insulative and porous material."

Appellants respectfully disagree. First, the text in column 1, lines 8-15 of Suzuki, read: "Therefore, it is established by law in certain countries that equipment be installed for detecting liquid leaks from petroleum pipelines and tanks. Also, it is desirable to install such leak detecting equipment on gas holding tanks, storage tanks and pipings used in chemical plants which contain dangerous liquids such as fuels, solvents or poisonous liquids." The text does not seem to confirm the above assertion. Similarly, Figure 2 by itself does not show that at least one of electrical conductors has a sheath of an electrically insulative and porous material. The description of Figure 2 (column 4, lines 12-15) reads: "As shown in FIG. 2, many conductors 2, 2' may be embedded in the conductive material 4 in a separated, parallel relationship as in the case of a flat cable." In other words, what

is called in the Office action an electrically insulative material, Suzuki considers a conductive material. For that reason, a combination of Suzuki and Gott would not have resulted in the appellants' invention as claimed in claim 1 even if this combination had been considered desirable in Suzuki.

The Appellants therefore respectfully submit that even if the "hot water heater failure protection device" of Moody can be equated to the drip tray of the present invention, claims 2 and 4 are not rendered obvious under 35 USC §103(a) since the two primary references of Suzuki and Gott do not teach claim 1, onto which claims 2 and 4 depend.

The rejection of claims 2 and 4 under 35 USC §103(a) based on Suzuki, Gott and Moody is improper and must be reversed.

CLOSING

In summary, the Appellants have shown that their claimed invention is fully supported by a body of evidence of non-obviousness. It is respectfully submitted that such evidence of non-obviousness overcomes any showing of obviousness presented by the Examiner. The Appellants therefore submit that the final rejection of their claims 1-21 is improper under 35 USC §103.

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The reversal of the final rejection is respectfully
solicited from the Board.

Respectfully submitted,

Tung & Associates

By: 

Randy W. Tung

Registration No. 31,311

Telephone: (248) 540-4040

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CLAIM APPENDIX

1. (Previously presented) An apparatus for detecting a liquid leak from a fluid vessel comprising:

a pair of electrical conductors located in relative proximity to said fluid vessel, said pair of electrical conductors comprising at least one electrical conductor characterized by an electrically insulative, porous sheath effective to provide electrical isolation of said at least one electrical conductor from the other electrical conductor;

✓ circuitry coupled to said electrical conductors effective to measure a resistance of the combination of the pair of electrical conductors and an electrical short therebetween caused by local conductivity through the porous sheath at a location whereat said liquid leak penetrates said sheath, whereby the resistance indicates the existence of a leak and the relative location of the leak along said at least one electrical conductor.

2. (Original) The apparatus as claimed in claim 1 further comprising a drip tray wherein said at least one insulated conductor resides.

3. (Original) The apparatus as claimed in claim 2 wherein said pair of electrical conductors comprises a second insulated conductor characterized by an electrically insulative, porous sheath, said pair of electrical conductors being in parallel adjacency.

4. (Original) The apparatus as claimed in claim 2 wherein said pair of electrical conductors comprises said drip tray.

5. (Original) The apparatus as claimed in claim 3 wherein said pair of electrical conductors comprises individually insulated conductors.

6. (Original) The apparatus as claimed in claim 3 wherein said pair of electrical conductors comprises integrally insulated conductors.

7. (Original) The apparatus as claimed in claim 1 wherein the circuitry comprises an ohmmeter.

8. (Original) The apparatus as claimed in claim 1 wherein the circuitry comprises a voltage source and a current sensing circuit.

9. (Original) The system according to claim 1 wherein the circuitry comprises a current source and a voltage sensing circuit.

10. (Previously presented) The apparatus as claimed in claim 1 wherein the said at least one insulated conductor comprises a chemically treated insulator which changes color when contacted by liquid, whereby leak existence and location may be discerned visually.

11. (Original) The apparatus as claimed in claim 10 wherein the insulator is chemically treated with copper sulfate.

12. (Original) The apparatus as claimed in claim 10 wherein said at least one insulated conductor comprises nichrome.

13. (Original) A method for determining existence and location of a fluid leak from a vessel comprising:

providing a pair of electrical conductors in proximity to said vessel, at least one of said pair of electrical conductors being elongate and having a sheath comprising an electrically insulative, porous material;

determining a resistance between said at least one of said pair of electrical conductors and said other electrical conductor; and

relating said resistance to one of a normal condition corresponding to the absence of a fluid induced electrical short between said pair of electrical conductors or a leak condition

corresponding to the presence of a fluid induced electrical short between said pair of electrical conductors, and further relating said resistance corresponding to a leak condition to a location along the at least one of said pair of electrical conductors.

14. (Original) The method as claimed in claim 13 wherein both of said pair of electrical conductors comprise elongate conductors having a sheath comprising an electrically insulative, porous material.

15. (Original) The method as claimed in claim 13 wherein the step of determining a resistance between said at least one of said pair of electrical conductors and said other electrical conductor includes measuring a resistance with an ohmmeter.

16. (Original) The method as claimed in claim 13 wherein the step of determining a resistance between said at least one of said pair of electrical conductors and said other electrical conductor comprises:

providing a predetermined current to the pair of electrical conductors; and

measuring a voltage through said pair of electrical conductors corresponding to said predetermined current.

17. (Original) The method as claimed in claim 13 wherein the step of determining a resistance between said at least one of said pair of electrical conductors and said other electrical conductor comprises:

providing a predetermined voltage to the pair of electrical conductors; and

measuring a current through said pair of electrical conductors corresponding to said predetermined voltage.

18. (Original) A method for determining existence and location of a fluid leak from a vessel comprising:

providing a pair of electrical conductors in proximity to said vessel, at least one of said electrical conductors being elongate and having a sheath comprising an electrically insulative, porous material;

providing one of a predetermined voltage and current to said pair of electrical conductors;

measuring the other one of a voltage and current not provided to said pair of electrical conductors;

determining from said provided one of a predetermined voltage and current and said measured other one of voltage and current not provided the existence and location of a fluid induced electrical short between said pair of conductors.

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19. (Original) The method as claimed in claim 18 wherein the step of determining the existence and location of a fluid induced electrical short between said pair of conductors comprises measuring a resistance.

20. (Original) The method as claimed in claim 19 wherein the resistance is measured with an ohmmeter.

21. (Original) The method as claimed in claim 18 wherein the step of determining of existence and location of a fluid induced electrical short between said pair of conductors comprises the use of one of a personal computer, programmable logic controller and embedded processor.